

A Prospective Study on the Practice of Conversion of Antibiotics from IV to Oral Route and the Barriers Affecting it

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Abstract:- The appropriate use of antimicrobial agents is crucial for patient's safety and public health. One way of optimizing antibiotic use is to switch earlier from intravenous to oral therapy. The main types of conversion are sequential therapy, switch therapy and step down therapy. The aim of the study is to evaluate the practice of conversion of intravenous to oral antibiotics and barriers affecting it. Barriers affecting conversion includes patient related factors, clinical course related factors and additional diagnostic factors. A prospective observational study was done for a period of six months at Karuna Medical College Vilayodi, Chittur. A standardized data entry form was prepared to record all patient details, investigations and therapy given. 145 patients were observed and the study shows that cephalosporins (41%) were the mostly prescribed intravenous antibiotics. Step down type conversions were mostly observed type of conversion that is of 45.3% followed by switch type (35.9%) and sequential type (18.7%). The study shows that early conversion of intravenous antibiotics can reduce the cost of therapy and length of stay.

Keywords:- Intravenous, Oral, Antibiotics, Conversion, Barriers.

I. INTRODUCTION

The appropriate use of antimicrobial agents is crucial for patient's safety and public health.^[1] One way of optimizing antibiotic use is to switch earlier from intravenous to oral therapy. The optimal time for switching to oral antibiotics is on days 2–4 of IV therapy.^[1,2,3] Patients fulfilling the predefined criteria for switch are evaluated. These criteria are based on both drug and host factors.^[2] There are mainly three types of IV to PO conversions.^[2,3,12] Sequential therapy refers to the act of replacing a parenteral version of a medication with its oral counterpart of the same compound.^[2,12] Switch therapy describes the conversion of an IV medication to a PO equivalent; within the same class and has the same level of potency, but of a different compound.^[2,12] and Step down therapy refers to the conversion from an injectable medication to an oral agent in another class or to a different medication within the same class where the frequency dose, and the spectrum of activity (in the case of antibiotics) may not be exactly the same.^[2,12]

Barriers affecting conversion includes patient related factors, clinical course related factors and additional diagnostic factors. Patient related factors were comorbidity, failure to take oral medication, elderly and non-adherence to therapy. Clinical course factors were patient is still ill, patient feels ill, fever, dyspnea, dyspnea with fever and hemodynamically unstable. Additional diagnostics factors such as ESR elevation, secondary infection, and unavailability of culture reports.

II. MATERIALS AND METHODS

The prospective observational study was conducted during a period of 6 months at Karuna Medical College Hospital Vilayodi, Chittur. The study was conducted according to the guidelines set by the Ethical Committee of the hospital. A total of 145 patients were evaluated. Inpatients receiving IV antibiotic for more than 48 hours and able to tolerate oral formulation were included in the study. Excluded from the analysis were, patients: younger than 10 years of age, Pregnant and lactating mothers, patients with malignancies or admitted to ICU, patients with serious/ life threatening infections. Treatment charts of the patients were reviewed prospectively for the prescription patterns of antibiotics by the clinicians and were followed up with oral conversion. Information on demographics, admission diagnosis, antibiotic therapies, duration of therapy, results of microbiological investigations were prospectively recorded on a standardized data entry form.

III. RESULTS

145 patients were evaluated prospectively. Out of this, 79 were male patients and 66 were female patients. Most of the patients were under the age group of 61-70 years (18.6%) followed by 31-40 years (17.9%), 41-50 years (16%) and 51-60 years (15.1%).

CLASS	NO. OF PATIENTS	PERCENTAGE (%)
CEPHALOSPORINS	49	41
FLUROQUINOLONES	43	36
AMINOGLYCOSIDES	10	8
GLYCOPEPTIDES	6	5
IMIDAZOLE	6	5
PENCILLIN	2	2
TETRACYCLINS	3	3

As shown in Table: 1, Cephalosporins (41%) were the mostly prescribed IV to oral antibiotics followed by Fluroquinolones (36%), Aminoglycosides (8%), Glycopeptides (5%), Imidazoles (5%), Tetracycline (3%) Penicillin (2%) .

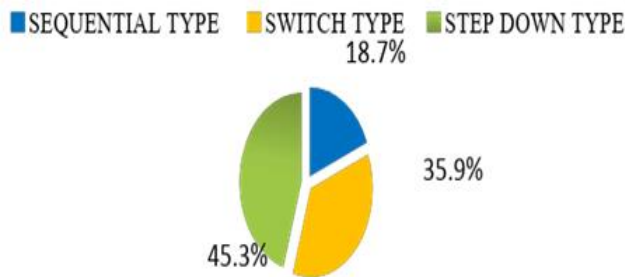


Fig 1:- Type of conversion

In fig 1 shows that step down type of conversion was the most common type of conversion (45.3%) followed by switch type (35.9%) and sequential type of conversion (18.7%).

Barriers affecting conversion includes patient related factors, clinical course related factors and additional diagnostic factors.

PATIENT FACTORS	NO. OF CASES	PERCENTAGE(%)
FAILURE TO TAKE ORAL MEDICATION	27	24.2
COMORBID ITY	43	38.3
ELDERLY	32	28.1
NON ADHERECE TO THERAPY	12	10.3

In Patient related barriers (Table 3), comorbidities were the commonly observed barrier (38.3%) followed by elderly (28.1%), failure to take oral medication (24.2%) and non-adherence to Therapy (10.3%).

CLINICAL COURSE FACTORS	NO. OF CASES	PERCENTAGE (%)
PATIENT IS STILL ILL	15	25.8
PATIENT FEELS ILL	10	17.2
FEVER	9	15.5
DYSPNEA	15	25.8
DYSPNEA WITH FEVER	7	12.0
HEMODYNAMICALLY UNSTABLE	2	3.4

Among clinical course factors (Table 3), dyspnea and patient is still ill were the most commonly seen barriers that is of (25.8%) followed by patient feels ill(17.2%), fever(15.5%),dyspnea with fever(12%) and hemodynamically unstable(3.4%).

ADDITIONAL DIAGNOSTICS FACTORS	NO. OF CASES	PERCENTAGE(%)
ELEVATED ESR	27	46.5
SECONDARY INFECTION	19	32.7
UNAVAILABILITY OF CULTURE REPORTS	12	20.6

Among additional diagnostics factors ESR elevation was the commonly seen barrier(46.5%) followed by secondary infection(32.7%) and unavailability of culture reports(20.6%). (shown in Tab.4).

Early switching has many potential benefits, including reduction in drug cost, patient stay and hospital-related morbidity.

TYPE OF CONVERSION	NO. OF CASES	MEAN LENGT H OF STAY	MEAN COST OF THERAPY	MEAN UNWANTED COST OF THERAPY
EARLY CONVERSION	19	2.5	303	471.35
LATE CONVERSION	126	8	1079	

According to our study, early conversion of IV to oral antibiotics had reduced the length of stay and the cost of therapy and hence reduce financial burden of the patient (shown in Tab. 5).

IV. DISCUSSION

In our study, length of stay was reduced when early conversion of IV to oral antibiotic were done and similar results were observed in the study conducted by oosterheert J J *et al*^[4] and Pardo RD *et al*^[1]. In our study we observed that the factors delaying the switch were mainly patient barriers and additional diagnostic factors but in study conducted by Engel F.M *et al*^[3], practical considerations, organizational factors are the most common barriers delaying the conversion. In our study, we found that switching of IV antibiotics (especially cephalosporin 3rd generation) to PO alternative was rare and the modification was done through discontinuation of the drug on the day of clinical stability rather than switching to PO therapy and similar results were observed in the study conducted by et al Shrayteh MS *et al*^[2]. The practice of conversion of IV to oral antibiotics were evaluated. The study concludes that the step down type conversion is the most common type practiced in this hospital. The length and cost of stay was seemed to be reduced when early switching of IV to oral antibiotics was done. The study suggests that switch from IV to oral antibiotics was unnecessarily delayed in patients due to different type of barriers.

V. ACKNOWLEDGMENT

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